

WHAT IS CLAIMED IS:

1. A semiconductor circuit, comprising:

5 a semiconductor die comprising, a die top surface, a die bottom surface, and a first plurality of electrical contacts coupled to the die bottom surface;

10 a package substrate comprising a substrate top surface, a substrate bottom surface, and a second plurality of electrical contacts wherein ones of the first plurality of contacts are electrically connected to ones of the second plurality of electrical contacts;

a lid above and substantially parallel to the die top surface;

15 a plurality of lid supports each comprising a post and standoff member wherein the lid supports collectively create a separation between the lid and die top surface.

2. The semiconductor circuit of Claim 1,

20 wherein the package substrate further comprises a series of openings receiving a portion of the post of at least one of the plurality of lid supports.

3. The semiconductor circuit of Claim 2,

25 wherein at least one of the plurality of lid supports further comprises a mechanical fastener capable of retractably passing through one of the series of openings and then opening after passing through such an opening to prevent the at least one of the plurality of lid supports from passing back through such opening.

4. The semiconductor circuit of Claim 1,  
wherein at least the post portion of at least one of  
the plurality of lid supports is integrally formed with  
the lid.

5

5. The semiconductor circuit of Claim 2,  
wherein at least one of the plurality of lid  
supports further comprises a mechanical fastener capable  
of passing through one of the series of openings to  
provide mechanical support for the semiconductor circuit  
when the semiconductor circuit is mounted on a printed  
circuit board.

10

6. The semiconductor circuit of Claim 1,  
wherein the lid comprises a plurality of countersunk  
openings;

15

wherein at least one of the plurality of lid  
supports is attached to the lid using a bolt inserted  
into one of the plurality of countersunk openings.

20

7. The semiconductor circuit of Claim 1,  
wherein the substrate comprises a package type  
selected from the group consisting of a ball grid array,  
a pin grid array, and a column grid array.

25

8. The semiconductor circuit of Claim 1,  
wherein at least one of the plurality of lid  
supports further comprises a threaded post and wherein  
the standoff member for such lid support comprises a  
threaded washer.

30

9. The semiconductor circuit of Claim 1, further comprising:

a high thermal conductivity paste disposed between the die top surface and the lid.

5

10. The semiconductor circuit of Claim 2, wherein at least one of the plurality of lid supports is soldered to the substrate bottom surface.

10

11. The semiconductor circuit of Claim 1, wherein at least one of the standoff members rests on the substrate top surface.

12. A method of making a semiconductor circuit, comprising:

forming a semiconductor die comprising, a die top surface, a die bottom surface, and a first plurality of electrical contacts coupled to the die bottom surface;

coupling the semiconductor die to a package substrate comprising a substrate top surface, a substrate bottom surface, and a second plurality of electrical contacts wherein ones of the first plurality of contacts are electrically connected to ones of the second plurality of electrical contacts;

connecting a lid above and substantially parallel to the die top surface using a plurality of lid supports each comprising a post and standoff member wherein the lid supports collectively create a separation between the lid and die top surface.

13. The method of Claim 12,

wherein the package substrate further comprises a series of openings receiving a portion of the post of at least one of the plurality of lid supports.

14. The method of Claim 13,

wherein at least one of the plurality of lid supports further comprises a mechanical fastener capable of retractably passing through one of the series of openings and opening after passing through such an opening to prevent the at least one of the plurality of lid supports from passing back through such opening.

15. The method of Claim 12,  
wherein at least the post portion of at least one of  
the plurality of lid supports is integrally formed with  
the lid.

5

16. The method of Claim 12,  
wherein the lid comprises a plurality of countersunk  
openings; and wherein the method further comprises  
attaching at least one of the plurality of lid  
10 supports to the lid using a bolt inserted into one of the  
plurality of countersunk openings.

17. The method of Claim 12,  
wherein the substrate comprises a package type  
15 selected from the group consisting of a ball grid array,  
a pin grid array, and a column grid array.

18. The method of Claim 13,  
wherein at least one of the plurality of lid  
20 supports further comprises a mechanical fastener capable  
of passing through one of the series of openings to  
provide mechanical support for the semiconductor circuit  
when the semiconductor circuit is mounted on a printed  
circuit board.

25

19. The method of Claim 12, further comprising:  
disposing a high thermal conductivity paste between  
the die top surface and the lid.

30

20. The method of Claim 13, further comprising:  
soldering at least one of the plurality of lid  
supports to the substrate bottom surface.